INSTRUCTION MANUAL

MODEL 2004A

REGULATED VOLTAGE SUPPLY

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KEITHLEY INSTRUMENTS, INC.
CLEVELAND, OHIO

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KEITHLEY INSTRUMENTS, INC.

CLEVELAND, OHIO

INSTRUCTIONS

KEITHLEY MODEL 2004A REGULATED VOLTAGE SUPPLY

I. General: The Keithley Instruments Model 2004A Regulated Voltage Supply is a line-operated source of dc potentials. It provides constant, accurate output, even under adverse conditions with varying line voltages. It is designed for general laboratory and production testing, and complements the Keithley line of Electrometer equipment, providing an especially stable and accurate potential source in measuring high resistances, polarizing photo cells, and supplying reference and signal potentials.

A. Voltage ranges: fixed potentials of 10, 25, 50, 100, 250, and 500 volts within 2%, and four ranges of variable potentials from 5 to 500 volts are available. NOTE: On the variable 200-500 volt range, the following specifications apply to voltages up to 500, not above.

B. Internal Impedance: fixed steps of 500 and 250 volts and the variable range of 200-500 volts have one ohm internal impedance; all other steps and ranges have 500 ohms.

B-1. Load Regulation: Less than 0.5 volt drop for 1 milliampere on any range.

C. A line voltage change from 100 to 130 volts causes less than 50 millivolts change in the output.

D. The maximum recommended load current is one milliampere. This is a safe limit which will not overload the regulator tube or the output cathode follower, and is completely adequate for ordinary operation. Most of the time the Model 2004A can supply plate current to one or two amplifier stages as well as to the principal component being measured.

E. The ac superimposed on the dc output is less than 5 millivolts rms for all ranges.

F. The fuse, 2 ampere, 8 AG, is located on the back side of the front panel, next to the pilot light.

II Description: DR 10669B, the circuit schematic diagram enclosed at the back, gives the circuit details. The power transformer is a Sola 7104, used on 100-130 volts, 60 cps power, only. (Special models are available for 230 volts, 50 cps power, or other values). The rectifier is a bridge of selenium rectifiers. Reference potential is obtained from a 5651 tube operating from an 0A2 supplied by the unregulated dc. The error amplifier has three stages, V5, V2, and V1.

The Range Switch performs three functions: first, it controls the fraction of the output voltage to be compared with the 5651 potential, hence the regulated potential (cathode of V1): second, it connects the output terminals to either the cathode follower (V6) or the regulated potential: third, it connects the grid of the cathode follower to the proper potential to get the correct output voltage. In all four Variable Ranges, either the grid of the comparison amplifier (V5 pin 7) or the cathode follower grid is connected to the Variable Adjust potentiometer on the panel. The potentiometers for trimming each of the fixed potentials are inside the cabinet and adjusted with the cabinet removed. The master control potentiometer, which adjusts the reference potential is a screwdriver adjustment, accessible through the left side of the cabinet.

The Polarity Switch conveniently makes the HI terminal either positive or negative with respect to the G terminal, which is connected to the cabinet, so that all the Range settings are available with either polarity.

The Range-Zero Switch connects the HI terminal to G in the Zero Output position, and to the value set by the Range Switch in the Range Output position. Operating the switch is a convenient way of controlling the electrification time when measuring insulation samples, and also generates step signals in measuring resistance-capacitance transients and dc amplifier gains.

The power switch and pilot light perform their conventional functions.

III Operation: The Model 2004A Test Voltage Supply is shipped complete with tubes and fuse, and is accurately calibrated at the factory.

To obtain output voltage, plug the power cord into 110-volt 60-cps power, and turn the power switch to ON. Allow a minute or two for the circuit to stablize after turning it on.

A. Connections: The G terminal on top of the cabinet is connected to the cabinet and chassis, and should be operated at ground potential. The HI terminal is high-voltage output. When making connections with the power on, it is recommended that the output switch be set to Zero Output.

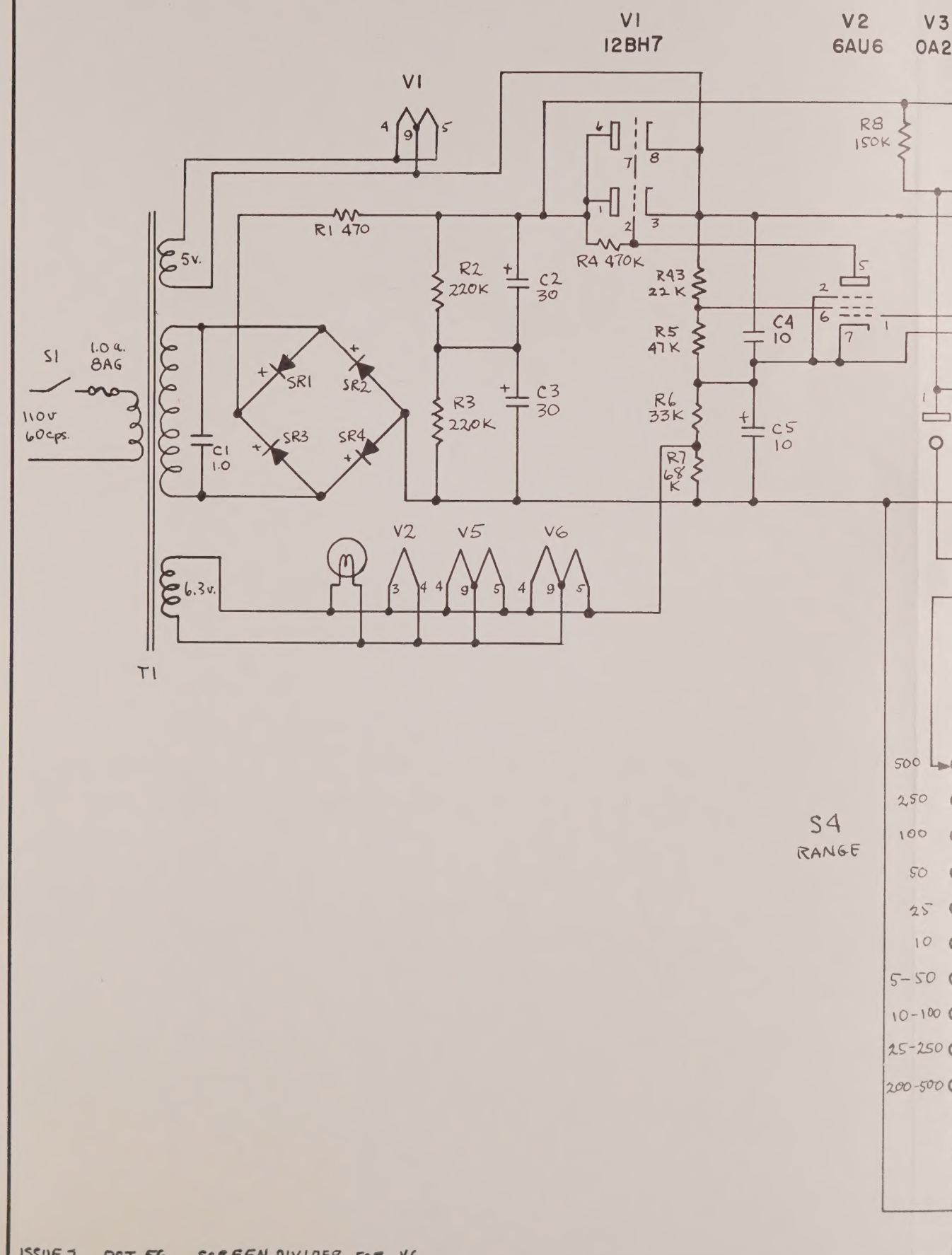
B. Range and Variable Adjustment. The six fixed potentials are obtained by setting the Range Switch to the desired step. To obtain other potentials, set the Range Switch to one of the variable steps; then use the Variable Adjust potentiometer, and a voltmeter connected to the output to set the desired potential. The Variable Adjust potentiometer is not effective with the Range Switch on one of the fixed steps.

C. Polarity Switch. HI+ makes the HI terminal positive with respect to G, HI- makes it negative. G is always connected to the chassis and cabinet.

D. Range Output--Zero Output Switch connects the Hi terminal to G in the Zero Output position and to the test voltage circuit in the Range position.

IV Maintenance: The 2004A circuit is conventional, and no special procedures or components are required for maintenance. The circuit schematic diagrams shows the dc potentials with the Range switch at 500 volts fixed. The chassis is removed from the cabinet by unscrewing the six #6 Binding head screws, three on the left side and three on the right side of the cabinet.

Realignment procedure: Set range switch at 500 volts, and make the output exactly 500 volts, as measured with an accurate meter, by turning the Master Cal potentiometer on the left face of the cabinet. Then turn the Range Switch to 250 volts and adjust the 250-volt potentiometer (accessible with the cabinet removed) for correct output, continuing through 100, 50, 25, and 10 volts. The settings will be no more accurate than the standardizing meter; and it is well to let the instrument warm-up for about an hour before recalibrating.



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DR 10669 -B

V4
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V5
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V6
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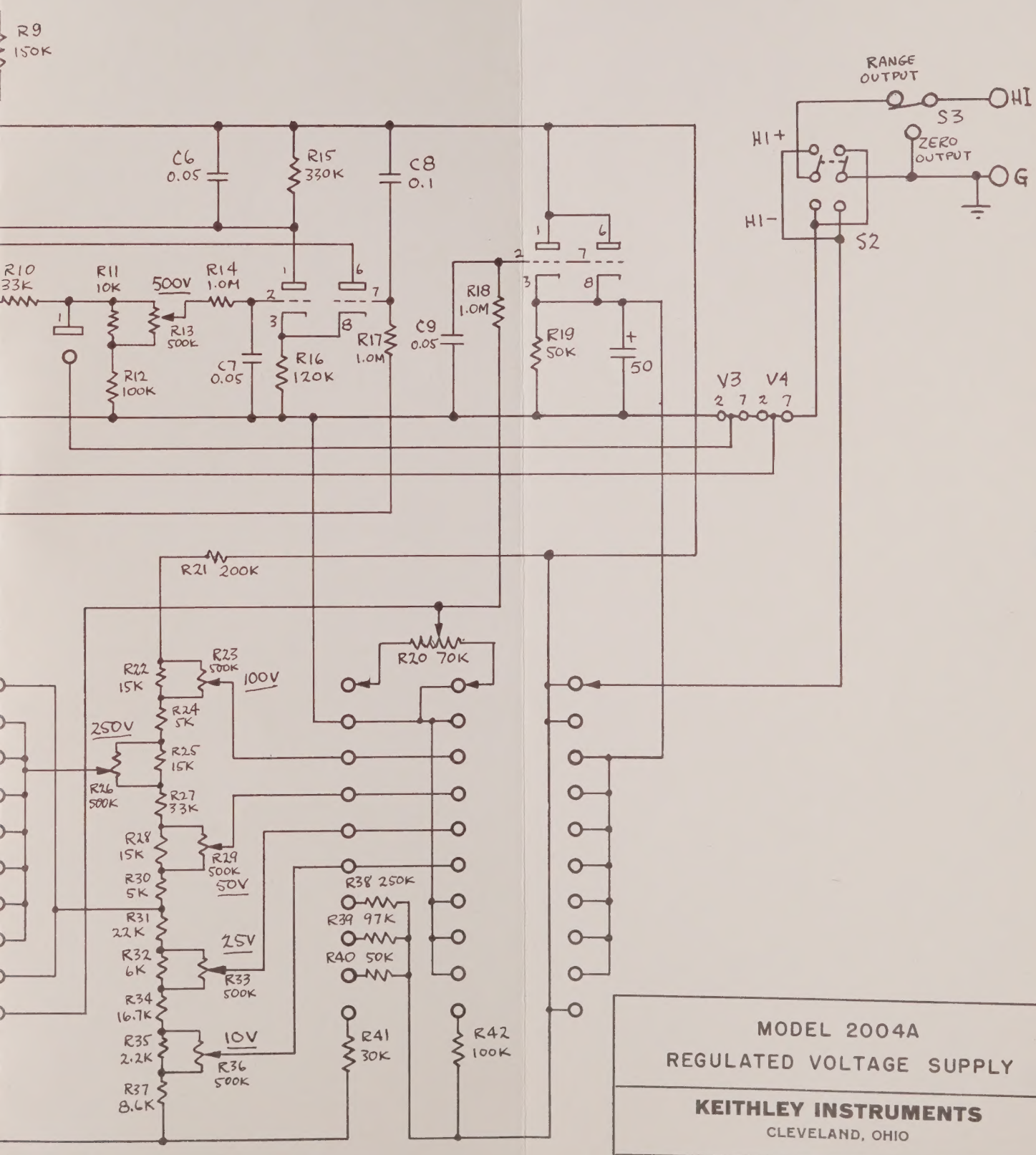

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